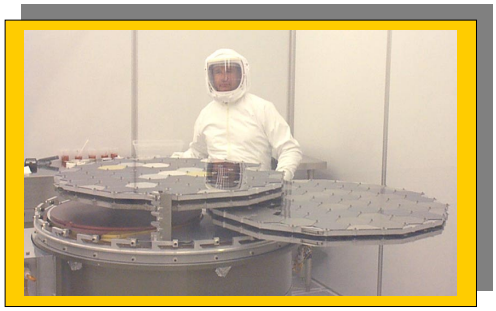
Dynamic Design: The Cleanroom

Mapping It Out

STUDENT ACTIVITY

BACKGROUND



Johnson Space Center

In this activity you will map out the actual placement of the wafers on the array by making a color key, then finding and coloring the locations on five arrays. You will then look at the finished array frames and identify patterns of wafer materials. Finally you will also discover why the wafers have slightly different thicknesses.

PROCEDURE

1. Assign one of the array frames to each student in your group. Each person should have a collector layout sheet and the material charts for the array they are going to work on.

2. Using the material chart note the different materials that are used on the wafers. Notice that some of the wafers contain one material layered onto another material.

3. On your collector layout sheet, label the letter name of your array and the thickness of the wafers on your array.

4. As a group, develop a color key that your group will use to complete the map. Write these colors in the appropriate column on the material chart.

5. Color your collector layout based on the code and the labels found on your student activity sheet.

QUESTIONS

1. Why do you think different materials are used for collecting solar wind particles?

2. Why is silicon the material that is used most frequently?

3. Why do you think some wafers have one material on top of another material?

4. Looking at your array, describe some patterns you notice in the placement of the materials.

5. Compare the results from your array with the results from one other member in your group. Describe similarities and differences in the patterns of wafer materials.

6. Look at the five collector arrays at the same time. Describe any patterns that are seen in all five arrays.

7. There is more contamination along the outside of the array. Why do you think the silicon wafers are found there?

8. Notice that with the exception of silicon, different materials are rarely found next to one another. Knowing that micrometeoroids may potentially destroy a wafer while the collectors are deployed, explain the rationale for this arrangement.

9. Notice the thickness reading that you recorded on your sheet. Notice that on the other arrays the measurement is slightly different. Why do you think this is so?

10. How would the material used affect the assembly process of the array? Are there any materials that you would want to be especially careful with during assembly? Explain.